TARGET APPARATUS

This invention relates to target apparatus. The target apparatus is especially useful for use for air gun target practice but it may be used for target practice with other guns if desired.

Various types of target apparatus for use with air guns are already known. These known types of target apparatus basically fall into two categories, one category of which is known as a spinner target, and the other category of which is known as a knock down target. The spinner target is available in various forms but it basically comprises a metal disc or discs of different sizes mounted on a shaft which spins when struck by an air gun pellet or other projectile. Spinner targets are normally mounted on a spike driven in the ground.

The knock down target usually comprises a target profile and a single target receiving station in the form of an aperture. This aperture is usually in a chest area of the target profile. The aperture is backed by a metal plate which, when struck, causes the whole target to fall down. Resetting of the target is by means of a lanyard which may be up to fifty meters long. The lanyard is pulled and this causes the target to stand up again. The knock down target usually has a non-adjustable base. This base is suitable for use on flat ground but it is not suitable if the knock down target is to be mounted on an uneven surface. Because the target must be reset manually by pulling on the lanyard, this requires that the air rifle, air pistol or other firearm

is put down whilst making the resetting. This can disturb the concentration of a person shooting and this is undesirable.

It is an aim of the present invention to provide target apparatus which is an improvement over the above two types of known target apparatus.

Accordingly, in one non-limiting embodiment of the present invention there is provided target apparatus comprising a target profile, a container for containing a plurality of targets, a first receiving station in the target profile and for receiving the targets from the container, a second receiving station in the target profile and for receiving the targets from the container, feed means for feeding the targets one at a time from the container to the first and second receiving stations, and drive means for causing the automatic operation of the feed means each time a target is hit and destroyed.

The target apparatus may be one in which the feed means is a sweeping arm feed means. Other types of feed means may be employed.

The sweeping arm feed means preferably comprises an arm which sweeps an open dispensing end of the container and causes the delivery of the targets one at a time from the container. The container may include biasing means for biasing the targets in the container towards the open dispensing end of the container. The biasing means may be a spring and plate arrangement. Other types of biasing means may be employed.

Preferably, the drive means is a mechanical drive means. Other types of drive means such for example as electrical drive means may alternatively be employed.

The mechanical drive means is preferably a spring powered drive means. The spring powered drive means preferably includes a constant force spring.

The mechanical drive means may include a pulley arrangement. The pulley arrangement may comprise a drive pulley, a drive belt, a cam pulley and a connecting rod, the connecting rod being such that it connects the cam pulley to the feed means.

Usually, the target profile will be that of an animal, person or object. Any suitable and appropriate animal, person or object may be employed. Thus, for example the target profile may be in the form of a crow, rabbit or squirrel.

Preferably, the target apparatus is one in which the first receiving station is in a head part of the target profile, and in which the second receiving station is in a body part of the target profile.

The target profile may be a non-moving target profile.

Alternatively, the target profile may be a moving target profile. The target apparatus may then be one in which the moving target profile is a rocking target profile, and in which the target apparatus includes rocker means for causing the moving target profile to rock. The rocker means is preferably an eccentric cam and spring arrangement. Other types of rocker means may be employed.

The target apparatus may include a base on which the target profile stands. Various designs for the base may be employed.

Usually, the first and the second receiving stations will be apertures. The apertures may be circular apertures or apertures of any other shape. The first and the second apertures may be of the same size or of different sizes.

The target apparatus may include size-reducing means for reducing the size of each one of the apertures.

The target apparatus may be one in which the size-reducing means is a first insert for being received in the aperture forming the first receiving means, and a second insert for being received in the aperture forming the second receiving means, and in which the first and the second inserts each has an insert aperture which is smaller than the aperture into which the insert is placed.

The target apparatus of the present invention may be manufactured and sold with or without the targets. The targets can be bought separately for subsequent installation in the container if desired.

The target apparatus of the present invention may comprise any two or more of the various above described components, and in any desired combination.

Embodiments of the invention will now be described solely by way of example and with reference to the accompanying drawings in which:

Figure 1 is a rear view of part of target apparatus of the present invention;

Figure 2 is a side view of the part of the target apparatus shown in Figure 1;

Figure 3 is a side elevation of a container part of the target apparatus shown in Figure 1;

Figure 4 is a top view of the container part of the target apparatus shown in Figure 3;

Figure 5 is a view from underneath of drive means forming part of the target apparatus shown in Figure 1;

Figure 6 is a side view of the drive means shown in Figure 5;

Figure 7 shows the target apparatus of Figure 1 mounted on a stand, and as viewed through a sight of a firearm;

Figure 8 is an elevated front view of the stand as shown in Figure 7;

Figure 9 is a side view of the stand as shown in Figure 8;

Figures 10a – 10f show six stages of operation of the target apparatus shown in Figure 1;

Figure 11 is a front view of size reducing means;

Figure 12 is a side view of the size reducing means shown in Figure 11;

Figure 13 is a rear view of the size reducing means shown in Figure 11;

Figure 14 is a perspective view of a first portion of an alternative container part to that shown in Figure 3; and

Figure 15 is a perspective view of a second portion of the alternative container part.

Referring to Figures 1 - 13, there is shown target apparatus 2 comprising a target profile 4, and a container 6 for containing a plurality of

targets 8. There are in fact twenty of the targets 8 and, as shown in Figure 3, the targets 8 are 3mm chalk discs but other types of targets may be employed.

The target apparatus 2 also comprises a first target receiving station 10 which is in the target profile 4 and which is for receiving the targets 8 from the container 6. The target apparatus 2 also further comprises a second target receiving station 12 which is also in the target profile 4 and which is also for receiving the targets 8 from the container 6.

The target apparatus 2 includes feed means 14 for feeding the targets 8 one at a time from the container 6 to the first and second receiving stations 10, 12. The target apparatus 2 also comprises drive means 16 for causing automatic operation of the feed means 14 each time a target 8 is hit and destroyed.

The feed means 14 is a sweeping arm feed means 14 having an arm 18 which sweeps an open dispensing end 20 of the container 6, and causes the delivery of the targets 8 one at a time from the container 6.

As shown in Figure 3, the container includes biasing means 22 for biasing the target 8 in the container 6 towards the open dispensing end 20 of the container 6. The biasing means 22 is a spring and plate arrangement comprising a compression spring 24 and a push plate 26.

The drive means 16 is a mechanical drive means. As best seen from Figure 1, the mechanical drive means 16 is a spring powered drive means including a constant force spring 28. The drive means 16 also includes a pulley arrangement 30. The pulley arrangement 30 comprises a drive pulley

32, a drive belt 34, a cam pulley 36 and a connecting rod 38. The drive belt 34 is made of spring steel which provides good gripping and also a buffer action when transferring power from the drive pulley 32. The connecting rod 38 connects the cam pulley 36 to the arm 18 of the feed means 14.

As can be seen from Figures 1 and 7, the target profile 4 is in the form of a crow. The target profile 4 may be of any other suitable and appropriate shape. The first receiving station 10 is in a head part 40 of the target profile 4. The second receiving station 12 is in a body part 42 of the target profile 4.

The target profile 4 is a moving target profile 4. More specifically, the moving target profile 4 is a rocking target profile which is caused to rock by rocker means 44. The rocker means 44 comprises an eccentric cam 46 and a spring 48. The spring 48 is an elongate spring which has one end 49 which bears on the profile 50 of the eccentric cam 46. This causes the rocking to be in the form of a bobbing action. The other end 51 of the spring 48 is located in a base 52 of the target apparatus 2. The base 52 is connected to the target profile 4 by a leg 54. The leg 54 is pivotally hinged by a pivot 56 to the base 52, and is also pivotally hinged by a pivot 58 to the body part 42.

As shown in Figure 4, the container 6 is mounted on a support 60 which has slots 62 at each end. The slots 62 fit over bolts 64 which terminate in nuts 66. This arrangement enables the support 60 and the container 6 easily to be removed for being refilled with the targets 8.

As shown in Figures 3 and 4, the container 6 is provided with a cocking rod 68 and an arrestor pin 70. As shown in Figures 1 and 6, the spring 32 is wound up using a winding handle 72. As can be seen from Figure 6 the drive pulley 32 has a serrated edge 74 to ensure good grip of the drive belt 34. The drive pulley 32 and the eccentric cam 46 are mounted on a main shaft 76. The main shaft 76 is split to secure one end of the spring 28. The split is shown in Figures 5 and 6 as split 78. The spring 28 has its other end 80 secured around a hole 82 which accommodates the spring loaded winding handle 72.

Figure 5 also shows how the target apparatus 2 is provided with an axial hole 84 for receiving the main shaft 76. A hole 86 is also provided in a base plate 88. A spring loaded pin from the winding handle 72 is pushed into a corresponding hole in the cam profile in order to lock the mechanism.

Figure 7 shows the target apparatus 2 with a target 8 in position in the second target receiving station 12. The target apparatus 2 is shown being viewed through a sight 90 of a fire arm such for example as an air rifle. The target profile 4 is shown mounted on a base 92. The base 92 has a platform portion 94 and three legs 96. The legs 96 are shown having pointed ends for enabling the base 92 to be pushed into soft ground. The platform portion 94 has upstanding members 98 for receiving the foot part 52 of the target profile 4.

Figures 8 and 9 show the base 92 in more detail. In Figures 8 and 9, the legs 96 have been turned upside down from the position shown in Figure 7. This is permitted by having the legs 96 separable from the platform

portion 94 and this is achieved as shown in Figure 9 by means of wing nuts 100 and bolts 102. Only one wing nut 100 and bolt 102 have been shown for ease of illustration. With the legs 96 in the position shown in Figures 8 and 9, the legs 96 have a foot part 104 for enabling the base 92 to be mounted on hard ground. The legs 96 are independently operable for leveling the base 92 on uneven ground.

Figures 10a – 10f show six stages of operation of the target apparatus 2. As can be seen from Figures 10a – 10f, each time a target 8 is hit and destroyed, the feed means 14 it automatically operated by the drive means 16 to feed the targets 8 one at a time from the container 6 to the first or the second receiving station 10, 12 requiring a target 8. As can be seen from the explanatory wording included in Figures 10a – 10f, the feed means 16 is prevented from moving when a whole target 8 is in position in the first and second receiving stations 10, 12. The use of pins 106, 107 for holding the target 8 in position will be noted, see for example Figures 10b and 10c. The connecting rod 38 moves vertically and causes the pick up arm 18 to have a head/body/head/body sweeping motion.

Figures 11 – 13 shown size-reducing means 108 for reducing the size of each one of the apertures which form the first and the second target receiving stations 10, 12. The size-reducing means 108 is an insert 110 which is for being received in a chosen one of the first and the second target receiving stations, 10, 12. The insert has an aperture 112 which is smaller than the aperture forming the first or the second target receiving station 10, 12. A slot 114 allows the insert 110 to be compressed prior to insertion so

that the insert 110 grips when it is in position. The insert has a shoulder 116 which is of an appropriate size depending upon whether or not the insert 110 is to fit into the first target receiving station 10 or the second target receiving station 12. The insert 110 has an overlap part 118 for sitting on the front face of the target profile 4 as best shown in Figure 12.

Referring now to Figures 14 and 15, there is shown a container 120 for receiving the targets 8. The container 120 comprises a hopper 122 and a hopper receiver 124. The hopper 122 comprises a hopper body 126, a fixed end cap 128, a collar 130 and a push plate 132. A coil spring 134 is located inside the hopper body 126. Three stainless steel spring clips 136 are provided. The spring clip 136 has a clip end 138 which co-operates with a pip 140. The hopper receiver 124 has three arms 142 which extend outwardly from a tubular sleeve 144. The tubular sleeve 144 has three cut-outs 146 as shown. These three cut-outs 146 co-operate with and receive the three clip ends 138 on the hopper 122.

The container 120 shown in Figures 14 and 15 operates such that the collar 130 on the hopper 122 sits permanently at the rear of the pip 140 on the illustrated spring clip 136 in Figure 14. The collar 130 slides between the positions A – B as shown in Figure 14. With the collar 130 at position A, the spring clips 136 define an open claw. Targets 8 (not shown in Figures 14 and 15) are then able to be inserted into the hopper body 126 from the opposite open end to the fixed end cap 26. When, for example, twenty of the targets 8 have been pushed into the hopper body 126, the collar 130 is slid down to the position B, where the collar 130 is at the rear of the pip 140.

This effectively closes the spring clips 136 in the manner of a claw, thereby holding the targets 8 (i.e. target discs) in place. When pushed into the hopper receiver 124 and twisted clockwise, the collar 130 is pushed back to the position A, and the spring clips 136 open into the cut-outs 146. This allows the targets 8 to be pushed forward by the push plate 132 and the coil spring 134.

It is to be appreciated that the embodiments of the invention described above with reference to the accompanying drawings have been given by way of example only and that modifications may be affected. Thus, for example, the target profile 4 could be a non-moving target profile if desired. The target profile 4 may be of a wide variety of different shapes and sizes to that shown in the drawings.